

REMARKS

Claims 1-13 are pending.

Claims 1-13 are rejected.

Claim 1 and 4 are amended.

**Amended claims 1 and 4**

Applicants have amended claims 1 and 4 to clearly indicate that it is the acidic aqueous mixture which is flocculated.

Support for the above amendment may be found for example in Example 1 of the disclosure on page 14, lines 7-9.

No new matter is added.

**35 USC 103(a)**

**Claims 1-5, 12 and 13 are rejected under 35 USC 103(a) as being unpatentable over Brink 4,384,897.**

The examiner believes the present claims differ from Brink by reciting the use of acid having a specific pKa and concentration. But examiner further believes that the acids disclosed in Brink would appear to have the recited pKa. Further examiner submits that the pH of 2 to 3 utilized in the first stage hydrolyzer of Brink would appear to include an acid concentration indistinguishable from the acid concentration in the present claims.

Applicants respectfully disagree.

According to Brink, col. 11, lines 23-31 in combination with fig. 4, it reads: "If a flocculating acidic material such as ferric or aluminum nitrate, sulfate or acetate is added, for example, through line 138a, it will enter hydrolysis unit 130 through recycle line 147 and will pass through line 155 into neutralization unit 156 where metallic ions will be precipitated as the hydrous oxides which will serve to flocculate solids suspended in the liquid and to precipitate these solids which then leaves through line 177 to secondary wet oxidation unit..."

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The Fe or Al salts are added to the hydrolysis I unit 130. However these salts are the "precursor" of flocculants and do not serve as flocculant - in either unit 130 or in unit 156. The metallic ions (Fe or Al) are precipitated in only the neutralization unit 156 to hydrous oxides which serve as flocculants.

To state more simply, although Brink may add a flocculant precursor to acidic material, flocculation does not occur until after neutralization takes place. Indeed, no flocculation is possible in Brink using the metallic ions until hydrous oxides are formed and this requires neutralization.

In contrast, the present process flocculates and separates the solids in acidic medium. The present method claims exclude a neutralization step before the solids-liquid separation step, i.e. the separation of solid biological matter occurs in acidic medium.

According to claim 4, step (iii), i.e. adjusting the pH of the obtained aqueous phase to a pH of at least 4, is carried out after the separation step (ii).

Additionally, there is no suggestion for modifying the process of Brink, in particular separating the suspended solids in acidic medium without neutralizing of the mixture. Indeed, there could be no motivation to flocculate under acidic condition because the flocculants used by Brink do not work under those conditions but require neutralization.

Furthermore, if an attempt was made to use the precursor flocculants in the acidic solution the claimed process would not result for the following reasons:

- The flocculants (hydrous oxides) are only formed in neutralized medium. No separation in an acidic environment would occur as presently required.
- What is flocculated are solids resulting from neutralization of acids. The present claims require separating the solid biological matter from the acidic aqueous mixture.

**Claim 6 is rejected under 35 USC 103(a) as being unpatentable over Brink as applied above and further in view of Foody, US 6,090,595.**

Brink does not suggest flocculating an acidic mixture comprising dissolved sugar or solid matter as argued above. Foody does not make up for the above deficiency.

Additionally, the wash cycle according to claim 6 differs from the wash step disclosed in Foody in that after washing the solid matter stages (i) and (ii) are repeated, i.e. a further hydrolysis step is carried out.

According to example 1, the following effect is found:

- The wash cycle improves the yield of sugar ("release further sugar") after repeating the acidic hydrolysis, in addition to 9% after washing, flocculation and separation (cf. page 14, lines 14-16).
- The resulting cake contains more lignin compared to the content of the first cycle (cf. page 14, 2<sup>nd</sup> par.).

The present method differs from the disclosure of Foody. Foody teaches "The glucose syrup is recovered by filtering the hydrolysis slurry; some washing of the fiber solids is carried out to increase the yield of glucose" (cf. col. 2, lines 39-42). Thus, Foody does not teach or suggest repeating the acidic hydrolysis and separation step after washing the fiber solids as presently claimed.

Even if a person skilled in the art repeated the hydrolysis step, one would repeat the enzymatic hydrolysis step and not an acidic hydrolysis step using an acid having a pKa below 4 in a concentration of at least 10% by weight. Thus, the skilled person would not arrive at the presently claimed invention.

**Claims 7-11 are rejected under 35 USC 103(a) as being unpatentable over Brink and further in view of Moffett US 6, 132,625.**

The Examiner believes that the above claims differ from Brink by reciting that the flocculating agent includes specific polymer or charged microparticulate material. Moffett discloses that it is known in the art to add a flocculating agent including polymers and anionic microgels, to aid in flocculating biosolids.

As discussed above, Brink requires a neutralization step in order for his solids-liquid separation to occur. Thus if one skilled in the art were inclined to use the polymer and anionic microgels in Moffett in the solid-liquids separation process of Brinks, one would not arrive at the presently claimed process- that is a process which separates the solid biological matter from the acidic aqueous

mixture. Instead, the combination would arrive at a process for separation of biological matter from a neutralized hydrolysate.

Therefore, subject-matter of claims 7 to 11 is unobvious based on Brink in view of Moffett.

Hence, claims 7 to 11 are also unobvious in light of Brink and Moffett.

#### **Double Patenting Rejections**

Claims 1-11 are provisionally rejected on the ground of nonstatutory obviousness type double patenting as being unpatentable over claims 1-21 of copending 10/523,230 of claims 1-22 of 10/523,302.

Applicant respectfully request that it makes more sense to wait and submit a terminal disclaimer once all the other rejections are addressed. At that point applicant and examiner will know the final state and limitations of the claims and the double patenting rejection may be looked at again to determine appropriateness of the rejection.

Reconsideration and withdrawal of the rejection of claims 1-13 is respectfully solicited in light of the remarks and amendments *supra*.

Since there are no other grounds of objection or rejection, passage of this application to issue with claims 1-13 is earnestly solicited.

Applicants submit that the present application is in condition for allowance. In the event that minor amendments will further prosecution, Applicants request that the examiner contact the undersigned representative.

Respectfully submitted,



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